Camera Module

The Raspberry Pi Camera Module is an official product from the Raspberry Pi Foundation. The original 5-megapixel model was released in 2013, and an 8-megapixel Camera Module v2 was released in 2016. For both iterations, there are visible light and infrared versions.

Hardware specification

	Camera Module v1	**Camera Module v2**
Net price	$25	$25
Size	Around 25 × 24 × 9 mm	
Weight	3g	3g
Still resolution	5 Megapixels	8 Megapixels
Video modes	1080p30, 720p60 and 640 × 480p60/90	1080p30, 720p60 and 640 × 480p60/90
Linux integration	V4L2 driver available	V4L2 driver available
C programming API	OpenMAX IL and others available	OpenMAX IL and others available
Sensor	OmniVision OV5647	Sony IMX219
Sensor resolution	2592 × 1944 pixels	3280 × 2464 pixels
Sensor image area	3.76 × 2.74 mm	3.68 x 2.76 mm (4.6 mm diagonal)
Pixel size	1.4 µm × 1.4 µm	1.12 µm x 1.12 µm
Optical size	1/4"	1/4"
Full-frame SLR lens equivalent	35 mm	
S/N ratio	36 dB	
Dynamic range	67 dB @ 8x gain	
Sensitivity	680 mV/lux-sec	
Dark current	16 mV/sec @ 60 C	
Well capacity	4.3 Ke-	
Fixed focus	1 m to infinity	
Focal length	3.60 mm +/- 0.01	3.04 mm

	Camera Module v1	Camera Module v2
Horizontal field of view	53.50 +/- 0.13 degrees	62.2 degrees
Vertical field of view	41.41 +/- 0.11 degrees	48.8 degrees
Focal ratio (F-Stop)	2.9	2.0

Hardware features

Available	Implemented
Chief ray angle correction	Yes
Global and rolling shutter	Rolling shutter
Automatic exposure control (AEC)	No - done by ISP instead
Automatic white balance (AWB)	No - done by ISP instead
Automatic black level calibration (ABLC)	No - done by ISP instead
Automatic 50/60 Hz luminance detection	No - done by ISP instead
Frame rate up to 120 fps	Max 90fps. Limitations on frame size for the higher frame rates (VGA only for above 47fps)
AEC/AGC 16-zone size/position/weight control	No - done by ISP instead
Mirror and flip	Yes
Cropping	No - done by ISP instead (except 1080p mode)
Lens correction	No - done by ISP instead
Defective pixel cancelling	No - done by ISP instead
10-bit RAW RGB data	Yes - format conversions available via GPU
Support for LED and flash strobe mode	LED flash
Support for internal and external frame synchronisation for frame exposure mode	No
Support for 2 × 2 binning for better SNR in low light conditions	Anything output res below 1296 x 976 will use the 2 x 2 binned mode
Support for horizontal and vertical sub-sampling	Yes, via binning and skipping
On-chip phase lock loop (PLL)	Yes
Standard serial SCCB interface	Yes
Digital video port (DVP) parallel output interface	No
MIPI interface (two lanes)	Yes
32 bytes of embedded one-time programmable (OTP) memory	No

Available	Implemented
Embedded 1.5V regulator for core power	Yes

Software features

Full camera software documentation can be found at raspbian/applications/camera.

Picture formats	JPEG (accelerated), JPEG + RAW, GIF, BMP, PNG, YUV420, RGB888
Video formats	raw h.264 (accelerated)
Effects	negative, solarise, posterize, whiteboard, blackboard, sketch, denoise, emboss, oilpaint, hatch, gpen, pastel, watercolour, film, blur, saturation
Exposure modes	auto, night, nightpreview, backlight, spotlight, sports, snow, beach, verylong, fixedfps, antishake, fireworks
Metering modes	average, spot, backlit, matrix
Automatic white balance modes	off, auto, sun, cloud, shade, tungsten, fluorescent, incandescent, flash, horizon
Triggers	Keypress, UNIX signal, timeout
Extra modes	demo, burst/timelapse, circular buffer, video with motion vectors, segmented video, live preview on 3D models

Mechanical drawing

- Camera Module v2 PDF

Schematics

- Camera Module v2 PDF